UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,279	01/30/2004	Tomoaki Kurano	008312-0307975	4287

		EXAMINER
909　　　7590　　　12/18/2006		FINDLEY, CHRISTOPHER G

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ART UNIT	PAPER NUMBER
2635	

DATE MAILED: 12/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-20_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _1/30/2004, 2/3/2006, 3/30/2006_.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed
> publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>   7, 9-12   15-19

2.   Claims 1-4, 7-12, and 15-20 are rejected under 35 U.S.C. 102(a) as being

anticipated by Masuyama et al. (US 6397347 B1).

3.   Re claim 1, Masuyama discloses an information recording apparatus comprising:

first and second information recording units configured to write and read data in a

predetermined amount of data units (Figs. 1 and 9); and a control section configured to

perform a switching control, such that when the data is being written in the first

information recording unit in the predetermined amount of data units, in a state where a

preset condition relating to a recording operation is not satisfied (column 1, lines 52-57),

the data in the predetermined amount of data units to be written in the first information

recording unit (e.g., faulty disk) is written in the second information recording unit (e.g.,

the remaining disks; see Fig. 2; column 2, lines 48-65; column 4, lines 29-35).

Re claim 2, Masuyama also discloses that the control section performs the

switching control, such that in a state where a time for writing the data in the

predetermined amount of data units in the first information recording unit exceeds a

preset limit time, an operation of writing data to the first information recording unit is

stopped, and the data in the predetermined amount of data units to be written in the first

information recording unit is written in the second information recording unit (column 1, lines 52-57; and column 6, lines 30-35).

Re claim 3, Masuyama further discloses that when a time for writing the data in the predetermined amount of data units in the second information recording unit exceeds a preset limit time, the control section provides a notification to that effect (column 9, lines 19-24).

Re claim 4, Masuyama discloses the control section performing the switching control, such that in a state where an operation of writing data in the predetermined amount of data units to the second information recording unit is completed, data in a predetermined amount of data units following the data written in the second information recording unit is written in the first information recording unit (column 7, lines 25-36; and column 8, lines 1-8). The "normal mode" mentioned in Masuyama is writing the next sequential data unit.

Re claim 7, Masuyama discloses that in a state where the operation of writing data is switched from the second information recording unit to the first information recording unit, the control section sets a write start address in the first information recording unit to a value equal to a sum of an address at which the operation of writing data to the first information recording unit is stopped and an address corresponding to an amount of data written in the second information recording unit (column 7, lines 22-36; column 11, lines 24-45; memory block addresses are memorized and used to write data back to the unit which failed. In addition, parallel write operations involving new data can take place while the reconstructed data is being written. Therefore, the writing

unit processing the new data must begin the write at a location which leaves sufficient memory space for the reconstructed data.).

Re claim 9, Masuyama also discloses where the control section performs the switching control, such that in a state where a number of retries for writing the data in the predetermined amount of data units in the first information recording unit exceeds a preset limit number, an operation of writing data to the first information recording unit is stopped and the data in the predetermined amount of data units to be written in the first information recording unit is written in the second information recording unit (column 1, lines 52-57; and column 9, lines 48-59).

Re claim 10, Masuyama describes an information recording apparatus comprising: a first information recording unit configured to write and read data in and from a first recording medium in a predetermined amount of data units (Figs. 1 and 9); a second information recording unit configured to write and read data in and from a second recording medium in a predetermined amount of data units (Figs. 1 and 9); a detecting section configured to detect a state where a preset condition relating to a recording operation is not satisfied (column 1, lines 52-57), when the data in the predetermined amount of data units is being written in the first recording medium in the first information recording unit (column 2, lines 44-46); and a control section configured to perform a switching control based on detection result of the detecting section such that the data in the predetermined amount of data units, which is to be written in the first recording medium in the first information recording unit, is written in the second recording medium in the second information recording unit (column 2, lines 48-65).

Re claim 11, Masuyama discloses that the detecting section detects that a time

for writing the data in the predetermined amount of data units in the first recording

medium in the first information recording unit exceeds a preset limit time (column 1,

lines 52-57); and the control section stops an operation of writing data in the first

recording medium in the first information recording unit based on the detection result in

the detecting section, and performs the switching control such that the data in the

predetermined amount of data units, which is to be written in the first recording medium

in the first information recording unit, is written in the second recording medium in the

second information recording unit (column 6, lines 30-35).

Re claim 12, Masuyama discloses the control section performing the switching

control, such that in a state where an operation of writing data in the predetermined

amount of data units in the second recording medium in the second information

recording unit is completed, data in a predetermined amount of data units following the

data written in the second recording medium in the second information recording unit is

written in the first recording medium in the first information recording unit (column 7,

lines 25-36; and column 8, lines 1-8). The "normal mode" mentioned in Masuyama is

writing the next sequential data unit.

Re claim 15, Masuyama describes an information recording method comprising:

detecting that a preset condition relating to a recording operation is not satisfied, when

data is being written in a first information recording unit in a predetermined amount of

data units (column 3, lines 8-11); and performing a switching control based on a

detection result, such that data in the predetermined amount of data units to be written

in the first information recording unit is written in a second information recording unit (column 3, lines 12-29).

Re claim 16, Masuyama also discloses the detecting that a preset condition relating to a recording operation is not satisfied is detecting a time for writing the data in the predetermined amount of data units in the first information recording unit exceeds a preset limit time (column 1, lines 52-57).

Re claim 17, Masuyama also describes that when a time for writing the data in the predetermined amount of data units in the second information recording unit exceeds a preset limit time, providing a notification to that effect (column 9, lines 19-24).

Re claim 18, Masuyama further discloses performing a switching control, such that in a state where an operation of writing data in the predetermined amount of data units to the second information recording unit is completed, data in a predetermined amount of data units following the data written in the second information recording unit is written in the first information recording unit. (column 7, lines 25-36; and column 8, lines 1-8). The "normal mode" mentioned in Daniels is writing the next sequential data unit.

Re claim 19, Masuyama describes setting a write start address in the first information recording unit to a value equal to a sum of an address at which the operation of writing data to the first information recording unit is stopped and an address corresponding to an amount of data written in the second information recording unit, in a state where the operation of writing data is switched from the second information recording unit to the first information recording unit (column 7, lines 22-36; column 11,

lines 24-45; memory block addresses are memorized and used to write data back to the

unit which failed. In addition, parallel write operations involving new data can take place

while the reconstructed data is being written. Therefore, the writing unit processing the

new data must begin the write at a location which leaves sufficient memory space for

the reconstructed data.).

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.   The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating
        obviousness or nonobviousness.

6.   Claims 5, 6, 13, and 14 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Masuyama et al. (US 6397347 B1) as applied to claims 1-4, 7, 9-12,

and 15-19 above, and further in view of Jose Renato Santos et al. ("Comparing Random

Data Allocation and Data Striping in Multimedia Servers," Joint International Conference

on Measurement and Modeling of Computer Systems; Proceedings of the 2000 ACM

SIGMETRICS international conference on Measurement and modeling of computer

systems; pages 44-55; ISBN:1-58113-194-1)

Re claims 5, 6, 13, and 14, Masuyama does not specifically disclose the use of a

buffer before writing data to the disk units, nor using the buffer level to determine

whether to switch the write operation to a different disk. However, Santos discusses the

techniques of data striping and random data allocation. Both techniques split a data file

into equally sized blocks and writes each block into a plurality of disks in an ordered

fashion (striping) or randomly (random data allocation). The instant application splits

the write data into predetermined amounts of data units and uses the buffer size as a

criterion for allocating each block of data units to one of the information recording units

in claims 5, 6, 13, and 14. In this case, if a data unit is written to the first information

recording unit, the next data unit is written to the second information recording unit, and

vice versa. Santos also describes this method (first sentence of Section 2.1; Figure 1).

Santos further discloses that the buffer size is considered when allocating the data units

(Table 1; Sections 4.1 and 4.2; buffer size per stream in number of blocks, nb; buffer

size per stream, BF). Since the data striping and random data allocation techniques of

Santos involve breaking up a large file into smaller parts and distributing those smaller

parts spread out over a plurality of disks, and the RAID system of Masuyama is

designed to distribute data over a plurality of disks, it would have been obvious to one of

ordinary skill in the art at the time of the invention to combine their teachings.

7.   Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Masuyama et al. (US 6397347 B1) as applied to claims 1-4, 7, 9-12, and 15-19 above,

and further in view of Kakuta et al. (US 5402428 A).

Re claim 8, Masuyama describes where the control section copies data written in

the second information recording unit to the first information recording unit (column 7,

lines 25-36; and column 8, lines 1-8). Masuyama does not specifically disclose that the

copied data is deleted from the second information recording unit. However, Kakuta

discloses an array disk system where write data is temporarily stored in a similar

backup system (column 8, lines 48-55). Since the storage of write data is temporary, it

is deleted after the backup operation is completed. Both Masuyama and Kakuta

disclose Redundant Arrays of Independent Disks (RAIDs), where error detection is

performed, and in the event of an error during a write operation, data is stored into a

backup disk with the purpose of restoring the data to the original target device after the

error is resolved. Since both systems are functionally identical, it would have been

obvious to one of ordinary skill in the art at the time of the invention to combine their

teachings.

Re claim 20, see claim 8.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure:

a. Disk array apparatus and method which supports compound raid configurations and spareless hot sparing

Jones (US 5479653 A)

"A disk array architecture which supports compound RAID configurations and which can automatically switch between various RAID configurations in case of drive failures to prevent data loss and retain data redundancy."

b. Method and apparatus for operating an array of storage devices

Styczinski (US 5708668 A)

" A storage controller operates an array of parity protected data storage units as a RAID level 5. One of the storage units is a dedicated write assist unit. The assist unit is a temporary storage area for data to be written to the other units."

c. Storage device array architecture with copyback cache

Brant (US 5274799 A)

"A fault-tolerant storage device array using a copyback cache storage unit for temporary storage. When a Write occurs to the RAID system, the data is immediately written to the first available location in the copyback cache storage unit. Upon completion of the Write to the copyback cache storage unit, the host CPU is immediately informed that the Write was successful. Thereafter, further storage unit accesses by the CPU can continue without waiting for an error-correction block update for the data just written."
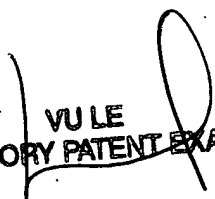
Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Findley whose telephone number is (571) 270-1199. The examiner can normally be reached on Monday-Friday 7:30am-5pm, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vu Le can be reached on (571) 272-7332. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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VU LE
SUPERVISORY PATENT EXAMINER